



Fugitive Sources and Fenceline Monitoring

Next generation Emission Measurements (NGEM) – ACE 2.3.4

BOSC AE SC Meet the Scientists
Session #1 - October 12, 2021

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Fugitive Sources and Process Malfunctions

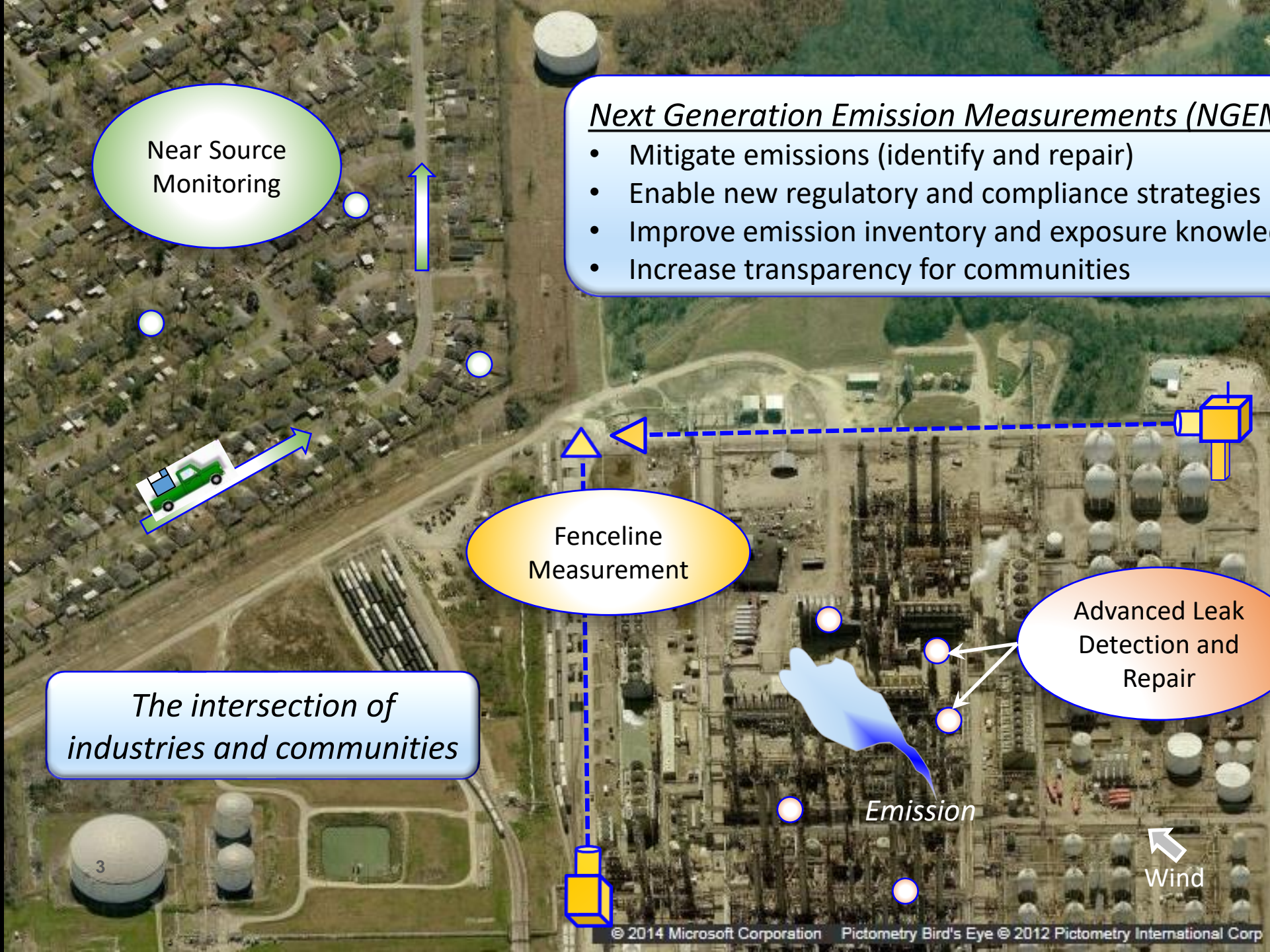
VOC Source
made visible
by NGEM



- Unexpected (stochastic)
- Unknown until discovered
- Underrepresented in inventories
- Can be proximate to communities
- Source impacts are uncertain

High potential for emissions reduction!
NGEM helps “find and fix”

Energy production, refining, distribution; industrial and chemical facilities; commercial operations, landfills



Near Source
Monitoring

Next Generation Emission Measurements (NGEM):

- Mitigate emissions (identify and repair)
- Enable new regulatory and compliance strategies
- Improve emission inventory and exposure knowledge
- Increase transparency for communities

Fenceline
Measurement

Advanced Leak
Detection and
Repair

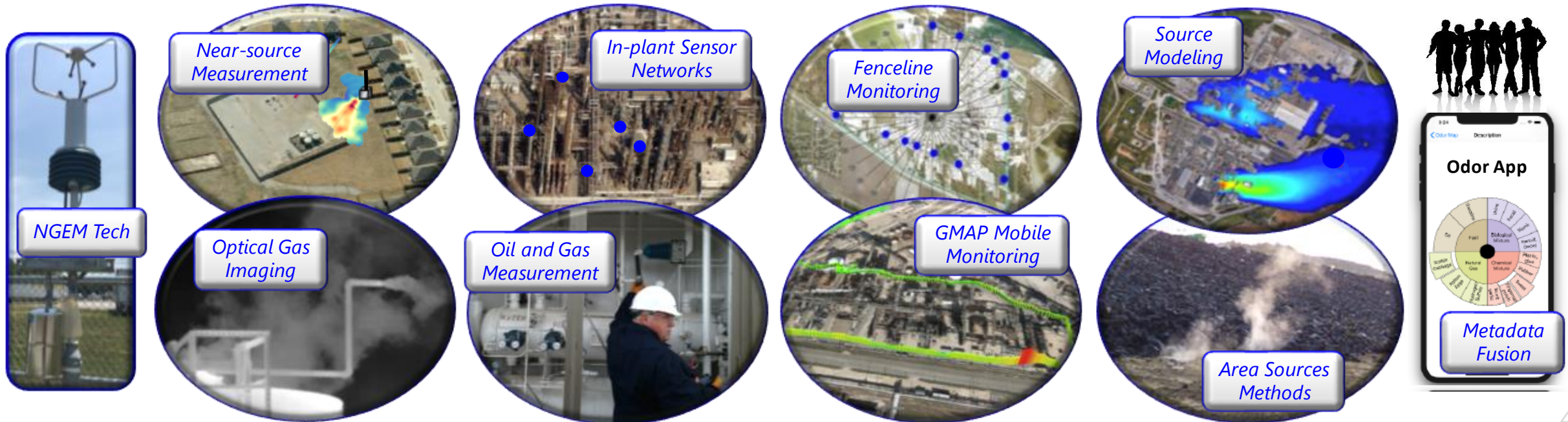
*The intersection of
industries and communities*

Emission

Wind

NGEM ACE 2.3.4

- EPA's refinery fenceline monitoring rule (benzene) adopted in Canada
- Collaboration on fenceline/NGEM with CA, CO, NH, GA, KY, and TX
- EPA's Geospatial Measurement of air Pollution (GMAP) mobile measurement technology (in use)
- Oil and gas NGEM studies in CO, TX, WY, UT, WV, and NM (just completed)
- Open-source EPA SPod fenceline design now commercially available
- Continuing to publish on Rubbertown NGEM Demonstration study (chemical facilities Louisville KY)
- Just concluded multi-year industry collaboration on leak detection sensor networks
- New NGEM projects on near fuel storage tanks and ethylene oxide facility (both start this month)



Selected Recent NGEM Publications

Progress on LDAR Innovation - Report on Research Under CRADA #914-16. E.D Thoma, H. Lane, M. MacDonald, C. Smith, B. Kelley, M. Clausewitz, D. Cartwright, K. Anderson, W. Peng, L. Lin, A. Chernyshov, M. Xu, D. Massner. U.S. EPA, Wash., DC, EPA/600/R-20/422, (2021) https://cfpub.epa.gov/si/si_public_record_report.cfm?Lab=CEMM&dirEntryId=350905

Detection limits of optical gas imaging for natural gas leak detection in realistic controlled conditions. D. Zimmerle, T. Vaughn, C. Bell, K. Bennett, P. Deshmukh, E. D. Thoma, Environmental Science & Technology 54, no. 18 (2020): 11506-11514. <https://doi.org/10.1021/acs.est.0c01285>

Understanding Pneumatic Controllers at Oil and Natural Gas Well Pad locations in the Denver-Julesburg Basin. M. Stovern, J. Murray, C. Schwartz, C. Beeler, E.D. Thoma, Jor. Air & Waste Manage Assoc. 70, no. 4 (2020): 468-480 <https://doi.org/10.1080/10962247.2020.1735576>

Spatial Analysis of Volatile Organic Compounds Using Passive Samplers in the Rubbertown Industrial Area of Louisville, Kentucky. S. Mukerjee, L. Smith, E. D. Thoma, D. Whitaker, K. Oliver, R. Duvall, T. Cousett, Atmospheric Pollution Research 11, no 6 (2020): 81-86 <https://doi.org/10.1016/j.apr.2020.02.021>

Rubbertown Next Generation Emissions Measurement Demonstration Project. E.D. Thoma, I George, R. Duvall, T. Wu, D. Whitaker, K. Oliver, S. Mukerjee, H. Brantley, J. Spann, T. Bell, N. Carlton-Carew, P. Deshmukh, J. Cansler, T. Cousett, W. Tang, A. Cooley, K. Zimmerman, B. DeWitt, B. Paris, International Journal of Environmental Research and Public Health, 16 no 11, (2019) 2041-2060. <https://doi.org/10.3390/ijerph16112041>

Leak Monitoring Systems and Methods of Utilizing the Same. E.D. Thoma, D. Preschler, R. Hilarides, M. Spiegel, U.S. Provisional Patent Application, No. 62/806,596, (2019).